

1.(Original) A method for measuring the noise in a picture that includes a plurality of lines, comprising:

receiving a digital picture signal that includes a plurality of pixels indicative of the picture; subdividing a line of said digital picture signal into several blocks (BL), each with several horizontally adjoining pixels, wherein a picture region (BR) includes a plurality of said blocks (BL) and the number of said blocks contained within said picture region (BR) corresponds to the number of pixels contained in each block (BL);

determining a luminance DC component value for each of picture blocks; processing for said picture region, said luminance DC component values associated with each of a plurality of blocks within said picture region, by comparing each of said luminance DC components to a minimum threshold value and a maximum threshold value, to detect at least one homogeneous picture region (BR) within the picture;

determining a high frequency component (HP) within said at least one detected homogeneous picture region (BR);

processing said high-frequency signal component (HP) to determine the noise contained in the picture and providing a noise signal indicative thereof; wherein

said luminance DC component of each block (BL) is determined by the following relation

$$(3) \quad LP(x',y) = \sum_{i=0}^n lum(i + nx',y), \quad LP(x',y) = \sum_{i=0}^n lum(i + nx',y),$$

where LP designates the luminance DC component of the corresponding block (BL), (x',y) designates the position of the corresponding block (BL) in the picture, lum designates the luminance value or the difference luminance value of the corresponding pixel, and n designates the number of horizontally adjoining pixels contained in the corresponding block (BL);

wherein each block (BL) contains five horizontally adjoining pixels, and for each block (BL) of the picture region (BR) which is recognized as homogeneous, a high frequency signal component (HP) is determined by the following relation

$$HP(x'y)=lum(5x',y)-2lum(1+5x',y)+2lum(2+5x',y)-2lum(3+5x',y)+lum(4+5x',y),$$

where HP designates the coefficient of the corresponding block (BL), (x',y) designates the position of the corresponding block (BL) in the picture, and lum designates the luminance value or the difference luminance value of the respective pixel.

2.(Previously Presented) A method for measuring the noise contained in a picture, by which the picture is described by an appropriate picture signal, comprising:

receiving a picture signal and processing said picture signal to detect at least one homogeneous picture region (BR) of the picture;

for the at least one detected homogeneous picture region (BR), measuring a high-frequency signal component (HP) contained in said picture signal; and

determining the noise contained in the picture from the high-frequency signal component (HP) and providing a noise signal indicative thereof.

3.(Previously Presented) A method for measuring the noise contained in a video picture, comprising:

receiving a video picture signal and processing said video picture signal to detect at least one homogeneous picture region of the picture;

for the at least one detected homogeneous picture region, measuring a high-frequency signal component contained in said video picture signal; and

determining the noise contained in the picture from the high-frequency signal component and providing a noise signal indicative thereof.

4.(Previously Presented) The method of claim 3, wherein said step of processing said video picture signal to detect said at least one homogeneous picture region of the picture includes filtering said video picture signal in a (1,1,1,1,1) filter.

5.(Previously Presented) The method of claim 3, wherein said step of measuring a high-frequency signal component contained in said video picture signal includes filtering said homogeneous picture region using a (1,-2,2,-2,1) filter.

6.(Previously Presented) The method of claim 3, wherein said step of processing said video picture signal to detect at least one homogeneous picture region of the picture includes processing a block of pixels comprising a plurality of horizontally adjoining pixels.

7.(Previously Presented) A method for measuring noise contained in a video picture that includes a plurality of regions, comprising:

processing said video picture region-by-region, wherein each region includes a plurality of blocks and each of the blocks includes a plurality of adjacent pixels;

processing each region to determine if the region is a homogeneous region; for at least one detected homogeneous region of the picture, on a block-by-block basis determining a high-frequency signal for each block associated with the homogeneous region of the picture and providing a high-frequency signal indicative thereof; and

determining the noise contained in the picture from the high-frequency signals and providing a noise signal indicative thereof.

8.(Previously Presented) The method of claim 7, wherein said step of processing each region to determine if the region is a homogeneous region includes filtering each block of the region in a (1,1,1,1,1) filter, and said step of determining a high-frequency signal includes filtering each block of the detected homogeneous picture region using a (1,-2,2,-2,1) filter.

9.(Previously Presented)      The method of claim 7, wherein each block of pixels comprises a plurality of at least five adjacent pixels.

10.(Previously Presented)      The method of claim 7, wherein said step of processing a video picture to detect at least one homogeneous region of the picture comprises:

for each region, processing the blocks within the region to calculate the average of the pixel luminance values contained within the block and providing an average block luminance signal value for each of the blocks in the region;

processing the average block luminance signal values for the blocks in the region, to determine the maximum average block luminance signal value and the minimum average block signal value in the region;

computing the difference between the maximum average block luminance signal value and the minimum average block luminance signal value and providing a difference signal indicative thereof; and

comparing said difference signal to a threshold value to determine if the region is homogeneous.

11.(Currently Amended)      The method of claim 710, wherein said step of determining a high frequency signal comprises:

filtering each block of the homogeneous region in a (1,-2,2,-2,1) filter to provide a high pass signal for each block in the homogeneous region; and

summing the high pass signals associated with each block in the region to provide a signal indicative of said noise signal.

12.(Previously Presented) An apparatus that measures noise contained in a video picture that includes a plurality of regions, wherein each region includes a plurality of blocks and each of the blocks includes a plurality of adjacent pixels, said apparatus comprising:

means for processing each region to determine if the region is a homogeneous region;

means for determining a high-frequency signal for each block associated with the detected homogeneous region of the picture and for providing a high-frequency signal indicative thereof; and

means for determining the noise contained in the picture from the high-frequency signals and for providing a noise signal indicative thereof.

13.(Previously Presented) The apparatus of claim 12, wherein said means for processing each region to determine if the region is a homogeneous region includes processing a block of pixels comprising at least five horizontally adjoining pixels.

14.(Previously Presented) The apparatus of claim 12, wherein each of said pixels includes an associated luminance value, and said means for processing each region to determine if the region is a homogeneous region includes a circuit that calculates the average of the pixel luminance values contained within the block of pixels.

15.(Previously Presented) The apparatus of claim 12, wherein each of said pixels includes an associated luminance value, and said means for processing comprises a low-pass digital filter.

16.(Previously Presented) The apparatus of claim 12, wherein said means for processing comprises:

means for processing the blocks within each region to calculate the average of the pixel luminance values contained within the block and providing an average block luminance signal value for each of the blocks in the region;

means for processing the average block luminance signal values for the blocks in the region, to determine the maximum average block luminance signal value and the minimum average block luminance signal value in the region;

means for computing the difference between the maximum average block luminance signal value and the minimum average block luminance signal value and providing a difference signal indicative thereof; and

means for comparing said difference signal to a threshold value to determine if the region is homogeneous.

17.(Previously Presented) The apparatus of claim 12, wherein said means for processing comprises:

a low-pass filter that calculates the average of the pixel luminance values contained within each block of the homogenous region and provides an average block luminance signal value for each of the blocks in the region;

a comparator circuit that determines the maximum average block luminance signal value and the minimum average block luminance signal value in the region;

a difference circuit that computes the difference between the maximum average block luminance signal value and the minimum average block luminance signal value and provides a difference signal indicative thereof; and

comparator responsive to said difference signal and a threshold value, that provides a signal indicative of whether or not the region is homogeneous.